

What is claimed is:

1. A semiconductor device comprising:
  - an insulating film formed on an electrode;
  - 5 a contact hole formed in the insulating film and disposed on the electrode;
  - a concave portion formed in the insulating film and formed connected with the contact hole; and
  - a pixel electrode embedded in the contact hole and the
  - 10 concave portion.
2. The semiconductor device according to claim 1, wherein the electrode is a drain electrode of a TFT.
- 15 3. The semiconductor device according to claim 1, wherein the pixel electrode comprises an ITO (indium tin oxide) film.
4. The semiconductor device according to claim 1, wherein at least a part of the pixel electrode is baked.
- 20 5. The semiconductor device according to claim 1, wherein the semiconductor device is one selected from the group consisting of a video camera, a still camera, a projector, a projection TV, a head mount display, a car navigation, a
- 25 personal computer, a mobile computer and a mobile phone.

6. A semiconductor device comprising:  
a first insulating film formed on an electrode;  
a stopper film formed on the first insulating film;  
5 a second insulating film formed on the stopper film;  
a concave portion formed in the second insulating film;  
a contact hole formed in the stopper film and the first  
insulating film located under the concave portion and above the  
electrode; and  
10 a pixel electrode embedded in the contact hole and the  
concave portion.

7. The semiconductor device according to claim 6,  
wherein the electrode is a drain electrode of a TFT.  
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8. The semiconductor device according to claim 6,  
wherein the pixel electrode comprises an ITO (indium tin  
oxide) film.

20 9. The semiconductor device according to claim 6,  
wherein at least a part of the pixel electrode is baked.

10. The semiconductor device according to claim 6,  
wherein the semiconductor device is one selected from the  
25 group consisting of a video camera, a still camera, a projector,  
a projection TV, a head mount display, a car navigation, a

personal computer, a mobile computer and a mobile phone.

11. A semiconductor device comprising:

an insulating film formed on an electrode;

5        a contact hole formed in the insulating film and located  
on the electrode;

a conductive film embedded in the contact hole; and

a pixel electrode formed on the insulating film and the  
conductive film embedded in the contact hole,

10       wherein a part of an edge of the contact hole and a part  
of an edge of the pixel electrode are align.

12. The semiconductor device according to claim 11,  
wherein the electrode is a drain electrode of a TFT.

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13. The semiconductor device according to claim 11,  
wherein the pixel electrode comprises an ITO (indium tin  
oxide) film.

20       14. The semiconductor device according to claim 11,  
wherein at least a part of the pixel electrode is baked.

15. The semiconductor device according to claim 11,  
wherein the semiconductor device is one selected from the  
25 group consisting of a video camera, a still camera, a projector;  
a projection TV, a head mount display, a car navigation, a

personal computer, a mobile computer and a mobile phone.

16. A semiconductor device comprising:

an insulating film formed on an electrode;

5 a contact hole formed in the insulating film and located on the electrode;

a conductive film embedded in the contact hole; and

a pixel electrode formed on the insulating film and the conductive film embedded in the contact hole,

10 wherein a part of the conductive film embedded in the contact hole is not covered by the pixel electrode.

17. The semiconductor device according to claim 16,  
wherein the electrode is a drain electrode of a TFT.

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18. The semiconductor device according to claim 16,  
wherein the pixel electrode comprises an ITO (indium tin oxide) film.

20 19. The semiconductor device according to claim 16,  
wherein at least a part of the pixel electrode is baked.

20. The semiconductor device according to claim 16;  
wherein the semiconductor device is one selected from the  
25 group consisting of a video camera, a still camera, a projector,  
a projection TV, a head mount display, a car navigation, a

personal computer, a mobile computer and a mobile phone.

21. A semiconductor device comprising:

an insulating film formed on an electrode;

5 a contact hole formed in the insulating film and located on the electrode; and

a pixel electrode embedded in the contact hole and formed on the insulating film,

wherein a part of an edge of the contact hole and a part  
10 of an edge of the pixel electrode are align.

22. The semiconductor device according to claim 21,  
wherein the electrode is a drain electrode of a TFT.

15 23. The semiconductor device according to claim 21,  
wherein the pixel electrode comprises an ITO (indium tin oxide) film.

24. The semiconductor device according to claim 21,  
20 wherein at least a part of the pixel electrode is baked.

25. The semiconductor device according to claim 21,  
wherein the semiconductor device is one selected from the  
group consisting of a video camera, a still camera, a projector,  
25 a projection TV, a head mount display, a car navigation, a  
personal computer, a mobile computer and a mobile phone.

26. A method of fabricating a semiconductor device comprising steps of:

forming an insulating film on an electrode;

5 forming a contact hole located on the electrode and a concave portion connected to the contact hole in the insulating film;

forming a conductive film embedding the contact hole and the concave portion and on the insulating film; and

10 forming a pixel electrode made of the conductive film embedded in the contact hole and the concave portion by one of a CMP polishing method and an etching-back method to the conductive film.

15 27. The method of fabricating the semiconductor device according to claim 26,

wherein the semiconductor device is one selected from the group consisting of a video camera, a still camera, a projector, a projection TV, a head mount display, a car navigation, a  
20 personal computer, a mobile computer and a mobile phone.

28. A method of fabricating a semiconductor device comprising steps of:

forming a first insulating film on an electrode;

25 forming a stopper film on the first insulating film;

forming a second insulating film on the stopper film;

etching the second insulating film with the stopper film as an etching stopper and thereby forming a concave portion in the second insulating film;

etching the stopper film and the first insulating film and  
5 thereby forming a contact hole in the stopper film and the first insulating film located below the concave portion and above the electrode;

forming a conductive film embedding the contact hole and the concave portion and on the second insulating film; and

10 forming a pixel electrode made of the conductive film embedded in the contact hole and the concave portion by one of a CMP polishing method and an etching-back method to the conductive film.

15 29. The method of fabricating the semiconductor device according to claim 28,

wherein the semiconductor device is one selected from the group consisting of a video camera, a still camera, a projector, a projection TV, a head mount display, a car navigation, a  
20 personal computer, a mobile computer and a mobile phone.

30. A method of fabricating a semiconductor device comprising steps of:

forming a first insulating film on an electrode;  
25 forming a stopper film on the first insulating film;  
forming a second insulating film on the stopper film;

etching the second insulating film, the stopper film and the first insulating film and thereby forming a contact hole in the second insulating film, the stopper film and the first insulating film located above the electrode;

5       etching the second insulating film with the stopper film as an etching stopper and thereby forming a concave portion connected to the contact hole in the second insulating film;

          forming a conductive film embedding the contact hole and the concave portion and on the second insulating film; and

10       forming a pixel electrode made of the conductive film embedded in the contact hole and the concave portion by one of a CMP polishing method and an etching-back method to the conductive film.

15       31. The method of fabricating the semiconductor device according to claim 30,

          wherein the semiconductor device is one selected from the group consisting of a video camera, a still camera, a projector, a projection TV, a head mount display, a car navigation, a  
20 personal computer, a mobile computer and a mobile phone.

          32. A method of fabricating a semiconductor device comprising steps of:

          forming an insulating film on an electrode;

25       etching the insulating film and thereby forming a concave portion in the insulating film;



etching the insulating film and thereby forming a contact hole in the insulating film located below the concave portion and above the electrode;

forming a conductive film embedding the contact hole and  
5 the concave portion and on the insulating film; and

forming a pixel electrode made of the conductive film embedded in the contact hole and the concave portion by one of a CMP polishing method and an etching-back method to the conductive film.

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33. The method of fabricating the semiconductor device according to claim 32,

wherein the semiconductor device is one selected from the group consisting of a video camera, a still camera, a projector,  
15 a projection TV, a head mount display, a car navigation, a personal computer, a mobile computer and a mobile phone.

34. A method of fabricating a semiconductor device comprising steps of:

20 forming an insulating film on an electrode;

etching the insulating film and thereby forming a contact hole located above the electrode;

etching the insulating film and thereby forming a concave portion in the insulating film connected to the contact hole;

25 forming a conductive film embedding the contact hole and the concave portion and on the insulating film; and

forming a pixel electrode made of the conductive film embedded in the contact hole and the concave portion by one of a CMP polishing method and an etching-back method to the conductive film.

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35. The method of fabricating the semiconductor device according to claim 34,

wherein the semiconductor device is one selected from the group consisting of a video camera, a still camera, a projector,  
10 a projection TV, a head mount display, a car navigation, a personal computer, a mobile computer and a mobile phone.

36. A method of fabricating a semiconductor device comprising steps of:

15 forming an insulating film on an electrode;

etching the insulating film and thereby forming a concave portion in the insulating film;

etching the insulating film and thereby forming a contact hole in the insulating film located below the concave portion  
20 and above the electrode;

forming a conductive film embedding the contact hole and the concave portion and on the insulating film;

removing a part of the conductive film located on the insulating film by one of a CMP polishing method and an  
25 etching-back method to the conductive film; and

forming a pixel electrode on the insulating film and the

conductive film remained,

wherein a part of an edge of the contact hole and a part of an edge of the pixel electrode are align.

5        37. The method of fabricating the semiconductor device according to claim 36,

wherein the semiconductor device is one selected from the group consisting of a video camera, a still camera, a projector, a projection TV, a head mount display, a car navigation, a  
10 personal computer, a mobile computer and a mobile phone.

38. A method of fabricating a semiconductor device comprising steps of:

forming an insulating film on an;

15 forming a contact hole in the insulating film located above the electrode;

forming the first ITO film embedding the contact hole and on the insulating film;

applying one of a CMP polishing and an etching-back to the  
20 first ITO film, and thereby removing the first ITO film on the insulating film with the first ITO film embedded in the contact hole remained;

baking the embedded first ITO film;

forming a second ITO film on the insulating film and the  
25 embedded first ITO film; and

etching the second ITO film, and thereby forming, on the

insulating film and the embedded first ITO film, a transparent electrode made of the second ITO film,

wherein a part of an edge of the contact hole and a part of an edge of the pixel electrode are align.

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39. The method of fabricating the semiconductor device according to claim 38,

wherein the semiconductor device is one selected from the group consisting of a video camera, a still camera, a projector,  
10 a projection TV, a head mount display, a car navigation, a personal computer, a mobile computer and a mobile phone.

40. A method of fabricating a semiconductor device comprising steps of:

15 forming an insulating film on an electrode;  
forming a contact hole in the insulating film located above the electrode;

forming a conductive film embedding the contact hole and on the insulating film;

20 applying one of a CMP polishing and an etching-back to the conductive film, and thereby thinning a thickness of the conductive film on the insulating film; and

etching the conductive film, and thereby forming a pixel electrode made of the conductive film on the insulating film,

25 wherein a part of an edge of the contact hole and a part of an edge of the pixel electrode are align.

41. The method of fabricating the semiconductor device according to claim 40, .

wherein the semiconductor device is one selected from the  
5 group consisting of a video camera, a still camera, a projector,  
a projection TV, a head mount display, a car navigation, a  
personal computer, a mobile computer and a mobile phone.